Final Exam

CMSY-199, Fall 2013B

Circle the letter of the best response for each item.

1. Which of the following is *not* a method in the `java.lang.Object` class?
   (a) `copy()`
   (b) `equals()`
   (c) `hashCode()`
   (d) `toString()`
2. Which pair of classes would be best represented by using an inheritance relationship?
   (a) `Employee` and `BirthDate`
   (b) `Employee` and `HireDate`
   (c) `Employee` and `FacultyMember`
   (d) `Employee` and `TelephoneNumber`
3. Which pair of classes would be best represented by using a composition relationship?
   (a) `Shape` and `Circle`
   (b) `Shape` and `Perimeter`
   (c) `Shape` and `Square`
   (d) `Shape` and `Triangle`
4. What type of method is required to invoke polymorphism?
   (a) abstract
   (b) overloaded
   (c) overridden
   (d) static
5. Which of the following may contain *both* abstract methods and method implementations?
   (a) abstract classes
   (b) concrete classes
   (c) enumerations
   (d) interfaces

6. Which of the following is a checked exception?
   (a) `ArithmeticException`
   (b) `ClassCastException`
   (c) `InputMismatchException`
   (d) `IOException`

7. For homework 4, which primitive type was used to represent each element of a `Matrix`?
   (a) `boolean`
   (b) `char`
   (c) `double`
   (d) `int`

8. What is the type of the parameter for the `setText()` method of the `JButton` class?
   (a) `char[]`
   (b) `String`
   (c) `StringBuilder`
   (d) `TextField`

9. A used car dealership needs a program to store information about the cars for sale. For each car, they want to keep track of the following information: the make and model, the model year, and the number of miles that the car has been driven. Which of the following is the best design?
   (a) Use one class, `Car`, which has four data fields: `boolean make`, `char model`, `String modelYear`, and `enum mileage`.
   (b) Use five unrelated classes: `Car`, `Make`, `Model`, `ModelYear`, and `Mileage`.
   (c) Use a class `Car` which has four subclasses: `Make`, `Model`, `ModelYear`, and `Mileage`.
   (d) Use one class, `Car`, which has four data fields: `String make`, `String model`, `int modelYear`, and `double mileage`.

10. Consider the following Java classes:

```
public class Superclass
{
   public void speak()
   {
      System.out.println(toString());
   }

   public String toString()
   {
      return String.format("I'm Superclass.");
   }
}

public class Subclass extends Superclass
{
   public void speak()
   {
      System.out.println(toString());
   }

   public String toString()
   {
      return String.format("Who is this Superclass?");
   }
}
```

What is the output produced by the following statements?

```
Superclass s = new Subclass();
s.speak();
```

(a) `I'm Superclass.`

(b) `Who is this Superclass?`

(c)
```
I'm Superclass.
Who is this Superclass?
```

(d) No output is produced

11. Which class is an unchecked exception?

(a) `ArrayIndexOutOfBoundsException`

(b) `ClassCastException`

(c) `NullPointerException`

(d) All of the above

12. Which of the following is one of the three stream objects associated with devices that Java creates when a program begins executing?

    (a) `System.input`

    (b) `System.output`

    (c) `System.error`

    (d) None of the above

13. For homework 6, which class was used as the superclass for the `KeyboardUI` class?

    (a) `JButton`

    (b) `JFrame`

    (c) `JPanel`

    (d) `JTextArea`

14. Which Java keyword can be used inside a constructor to call a constructor in another class?

    (a) `clone`

    (b) `implement`

    (c) `super`

    (d) `this`

15. What type of class relationship does Java keyword `extends` apply to?

    (a) composition

    (b) dependency

    (c) inheritance

    (d) realization

16. A `BasePlusCommissionEmployee` class is written using composition along with a `CommissionEmployee` class. Which expression might appear inside a six-argument constructor?

    (a) `this(first, last, ssn, sales, rate, salary)`

    (b) `super(first, last, ssn, sales, rate)`

    (c) `new CommissionEmployee(first, last, ssn, sales, rate)`

    (d) None of the above

17. What type of relationship exists between the classes `Chocolate`, `PeanutButter`, and `ReesesCup` if the `ReesesCup` class has member variables of type `Chocolate` and `PeanutButter`?

    (a) Inheritance

    (b) Composition

    (c) Dependency

    (d) Realization

18. Consider the following Java class:

```
 1 public class AbstractArt
 2 {
 3    public String name;
 4    public double value;
 5
 6    public String toString()
 7    {
 8       return String.format("name=%s value=%s ",name,value);
 9    }
10
11    public static void main(String args[])
12    {
13       Art pollock = new Art();
14       pollock.name = "No. 5, 1948";
15       pollock.value = 1.518E8;
16       System.out.println(pollock);
17    }
18 }
```

    What is the output when the class is compiled and run?

    (a) `name=No.  5, 1948 value=1.518E8`

    (b) Compilation error on line 6

    (c) Compilation error on line 13

    (d) An exception is thrown at runtime

19. What must be done to prevent classes which implement the following interface from modifying the values of the fields?

```
public interface PhysicalConstant
{
   double SPEED_OF_LIGHT = 2.99792458e8;
   double IDEAL_GAS_CONSTANT = 8.314472;
   double PLANCKS_CONSTANT = 6.62606896e-34;
   double AVOGADROS_NUMBER = 6.0221415e23;
}
```

   (a) Add the modifier `final` to each field declaration

   (b) Add the modifier `static` to each field declaration

   (c) Add the modifiers `final` and `static` to each field declaration

   (d) Nothing must be done

20. Consider the following Java class:

```
import java.io.*;

public class ExceptionCatcher
{
   public static void main(String args[])
   {
      String filename = "Foo.java";
      try
      {
         FileReader foo = new FileReader(filename);
      }
      catch(FileNotFoundException fnfe)
      {
         System.out.println("The file " + filename + " cannot be found.");
      }
   }
}
```

   If the file `Foo.java` exists and is in the appropriate path, what is the output when the class is compiled and run?

   (a) `The file Foo.java was found.`

   (b) `The file Foo.java cannot be found.`

   (c) A stack dump is output

   (d) No output is produced

21. Which of the following has the items in the correct order for a valid Java source code file?

    (a) class declarations, package declaration, import declarations

    (b) import declarations, package declaration, class declarations

    (c) package declaration, class declarations, import declarations

    (d) package declaration, import declarations, class declarations

22. Which access modifier is often used with an inheritance hierarchy to allow subclasses to have direct access to superclass instance variables?

    (a) `private`

    (b) `protected`

    (c) `public`

    (d) `default`

23. Given the following Java class which is already compiled and in the classpath:

```
package cigar.cuba;

class Cohiba
{
   public String toString()
   {
      return new String("Handmade from the finest tobacco available in Cuba");
   }
}
```

    What could be done to make the following application compile and run?

```
import cigar.cuba.Cohiba;

public class CigarAficionado
{
   public static void main(String args[])
   {
      System.out.println(new Cohiba());
   }
}
```

    (a) Nothing must be done to make the application compile and run

    (b) Move the `CigarAficionado` class to the `cigar` package

    (c) Make the `CigarAficionado` class a subclass of the `String` class

    (d) Change the access modifier of the `Cohiba` class

24. What is the correct method header to handle events generated by a `JButton`?

    (a) `public void actionPerformed(ActionListener e)`

    (b) `public void actionPerformed(ActionError e)`

    (c) `public void actionPerformed(ActionEvent e)`

    (d) `public void actionPerformed(ActionException e)`

25. The process by which an entire object may be written to file is called

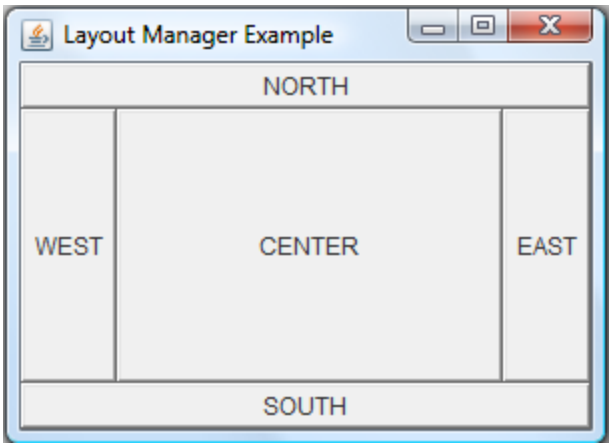
    (a) Abstraction

    (b) Encapsulation

    (c) Realization

    (d) Serialization

26. Which Swing component has the layout manager depicted in the following figure as its default?



    (a) `JApplication`

    (b) `JFrame`

    (c) `JLabel`

    (d) `JWindow`

27. Which layout manager places componenets sequentially (left to right) in the order they were added?

    (a) `BorderLayout`

    (b) `FlowLayout`

    (c) `GridLayout`

    (d) `DefaultLayout`

28. Consider the following Java class:

```
package animal.mammal.marine;

public class Whale
{
   String getMantra()
   {
      return "Save the Whales";
   }
}
```

From which of the following is the `getMantra` method *not* accessible?

(a) Inside the `Whale` class

(b) A subclass in the `animal.mammal.marine` package

(c) A subclass outside the `animal.mammal.marine` package

(d) A class in the `animal.mammal.marine` package

29. What is the output when the following Java class is compiled and run?

```
public class FrayedKnot
{
   public static void main(String args[])
   {
      FrayedKnot f = new FrayedKnot();
      System.out.println(f);
      System.out.println("We don't serve Strings.");
   }

   public String toString()
   {
      return String.format("I'm afraid not!");
   }
}
```

(a)
```
I'm afraid not!
We don't serve Strings.
```

(b)
```
FrayedKnot@3e25a5
We don't serve Strings.
```

(c) Compilation error

(d) An exception is thrown at runtime

30. Given the following Java class:

```
import java.io.*;
import java.util.*;

public class TextFileReader
{
   public static void main(String args[])
   {
      try
      {
         /* Insert line of code here */
         Scanner s = new Scanner(f);
         while(s.hasNext()) System.out.println(s.nextLine());
      }
      catch(IOException ioe)
      {
         ioe.printStackTrace();
      }
   }
}
```

Which line of code could be inserted in order to read input from the file `textfile.txt`?

(a) `File f = new File("textfile.txt");`

(b) `InputStream f = new FileInputStream("textfile.txt");`

(c) `Reader f = new FileReader("textfile.txt");`

(d) `All of the above`

31. Which modifier can be used to cause a member variable to be ignored during the serialization process?

(a) `absolute`

(b) `public`

(c) `skip`

(d) `transient`

32. What class can be used to read data from any text-based stream?

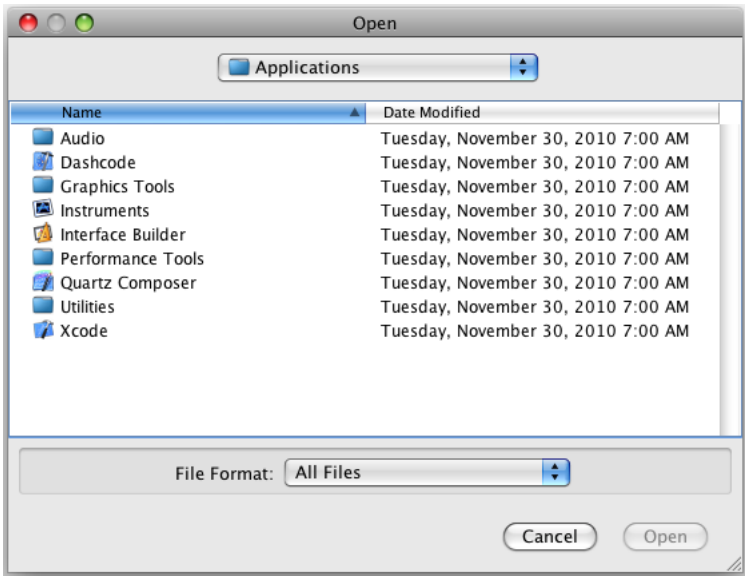
(a) `Formatter`

(b) `Outputter`

(c) `Scanner`

(d) `Streamer`

33. What method in the `JFileChooser` class can be called to produced the dialog shown in the following figure?



(a) `showCloseDialog`

(b) `showNewDialog`

(c) `showOpenDialog`

(d) `showSaveDialog`

34. What is the output when the following Java class is compiled and run?

```
import java.io.*;

public class IdentityVerifier
{
   public static void main(String args[])
   {
      Object s = new String();
      if (s instanceof Object) System.out.println("Strings are Objects");
      if (s instanceof Serializable)
         System.out.println("Strings are Serializable");
   }
}
```

(a)
```
Strings are Objects
Strings are Serializable
```

(b)
```
Strings are Serializable
```

(c) Compilation error

(d) An exception is thrown at runtime

35. What is the output when the following Java class is compiled and run?

```
import java.io.*;

public class Vagabond implements Serializable
{
   private transient int id;

   public static void main(String args[])
   {
      Vagabond v1 = new Vagabond();
      v1.id = 3;
      Vagabond v2 = v1.copy();
      System.out.println(v1.id == v2.id);
   }

   public Vagabond copy()
   {
      Vagabond v = null;
      try
      {
         ObjectOutputStream output = new ObjectOutputStream(
            new FileOutputStream("vagabond.ser"));
         output.writeObject(this);
         ObjectInputStream input = new ObjectInputStream(
            new FileInputStream("vagabond.ser"));
         v = (Vagabond) input.readObject();
      }
      catch(Exception e)
      {
         e.printStackTrace();
      }
      finally
      {
         return v;
      }
   }
}
```

(a) `true`

(b) `false`

(c) Compilation error

(d) An exception is thrown at runtime

36. Given the following Java classes which are already compiled and in the classpath:

```
public class Dog
{
   public void eat()
   {
      System.out.print("eat ");
   }
}

public class Achilles extends Dog
{
   public void eat()
   {
      System.out.print("swallow it hole ");
   }
}

public class Chloe extends Dog
{
   public void eat()
   {
      System.out.print("chew it up ");
   }
}
```

What is the output when the following application is compiled and run?

```
public class DogEat
{
   public static void main(String args[])
   {
      Dog pets[] = new Dog[2];
      pets[0] = new Achilles();
      pets[1] = new Chloe();
      for (Dog d : pets) d.eat();
   }
}
```

(a) `eat eat`

(b) `swallow it whole chew it up`

(c) Compilation error

(d) An exception is thrown at runtime

37. What is the output if one attempts to compile the following Java class files and run the `Enigma` application?

```
public class Rotor
{
   private StringBuilder[] wiring;

   public Rotor(String letters)
   {
      wiring[0] = new StringBuilder(letters);
      wiring[1] = new StringBuilder("ABCDEFGHIJKLMNOPQRSTUVWXYZ");
   }
}

public class Enigma
{
   private Rotor rotors[];

   public Enigma()
   {
      rotors = new Rotor[4];
      rotors[1] = new Rotor("EKMFLGDQVZNTOWYHXUSPAIBRCJ");
      rotors[2] = new Rotor("AJDKSIRUXBLHWTMCQGZNPYFVOE");
      rotors[3] = new Rotor("BDFHJLCPRTXVZNYEIWGAKMUSQO");
      System.out.println("Rotors have been initialized");
   }

   public static void main(String args[])
   {
      Enigma enigma1 = new Enigma();
      System.out.println("Enigma machine with 3 rotors created");
   }
}
```

(a) `Enigma machine with 3 rotors created`

(b)
```
Rotors have been initialized
Enigma machine with 3 rotors created
```

(c) Compilation error

(d) An exception is thrown at runtime

38. The following Java class does not compile and run:

```
public class FootballTeam
{
   private String city;
   private String quarterback;

   public FootballTeam(String city)
   {
      setCity(city);
   }

   public void setCity(String city)
   {
      this.city = city;
   }

   public void setQuarterback(String quarterback)
   {
      this.quarterback = quarterback;
   }

   /* Insert line of code here */

   public static void main(String args[])
   {
      FootballTeam steelers = new FootballTeam("Pittsburgh");
      steelers.setCity("Pittsburgh");
      steelers.setQuarterback("Ben Roethlisberger");

      FootballTeam ravens = new FootballTeam();
      ravens.setCity("Baltimore");
      ravens.setQuarterback("Joe Flacco");
   }
}
```

Which line of code could be inserted to make the class compile and run?

(a) `public this(){}`

(b) `public super(){}`

(c) `public FootballTeam(){}`

(d) `public void FootballTeam(){}`

39. What is the output when the following Java class is compiled and run?

```
public class DivideByZero
{
   public static void main(String args[])
   {
      System.out.println("100 divided by 0 = " + (100 / 0));
   }
}
```

(a) `100 divided by 0 = 0`

(b) `100 divided by 0 = Infinity`

(c) Compilation error

(d) An exception is thrown at runtime

40. Given the following two Java class files:

```
public class Exam
{
   public static void finish()
   {
      System.out.println("Congratulations! You have finished the exam.");
   }
}

public class FinalExam extends Exam
{
   public static void main(String args[])
   {
      /* Insert line of code here */
   }
}
```

Which line of code could be inserted to call the `finish` method?

(a) `Exam.finish();`

(b) `FinalExam.finish();`

(c) `finish();`

(d) All of the above